WHAT IS CLAIMED IS:

1. A semiconductor layer laser annealling method for improving characteristic of a semiconductor layer formed on a substrate by irradiating a laser beam, wherein

an energy level in a region to be irradiated by the laser beam is set such that a level towards the rear of a region along which the laser beam scans is lower than that at the front area or the center area of the region.

2. A semiconductor layer laser annealling method for obtaining a polycrystal semiconductor layer by irradiating a laser beam on an amorphous semiconductor layer formed on a substrate, wherein

an energy level in a region to be irradiated by the laser beam is set such that a level towards the rear of a region along which the laser beam scans is lower than that at the front area or the center area of the region.

3. A laser annealling method according to claim 2, wherein the energy level at the front or center of the region is equal to or greater than the upper limit energy level, which thereby maximizes grain size of the semiconductor layer.

4. A semiconductor layer laser annealling method for obtaining a polycrystal semiconductor layer by irradiation of an amorphous semiconductor layer formed on a substrate with a

laser beam, wherein

an energy level in a region to be irradiated by the laser beam is set such that the peak level in the rear area of a region along a scan direction of the laser beam is lower than the upper limit energy level which maximizes semiconductor layer grain size.

5. A laser annealling method according to claim 4, wherein the peak level of the laser beam at the front area or the center area of the region along the scan direction of the laser beam is equal to or greater than the upper limit energy level which maximizes a grain size of the semiconductor layer.

6. A laser annealling method according to claim 4, wherein the laser beam irradiated on the amorphous semiconductor layer is obtained by shaping a laser beam generated from a laser oscillation source by an optical system including a plurality of lenses, such that the region to be irradiated has a predetermined shape, and

the energy level, energy distribution, or their combination in the region to be irradiated by the laser beam are controlled by adjusting a distance between the amorphous semiconductor layer formed on the substrate and the focal point of the laser beam formed by the optical system.

7. A laser annealling method according to claim 6, wherein the scan direction of the laser beam is set such that an

energy level at the rear area of the region along the scan direction is lower than the upper limit energy level.

8. A laser annealling method according to claim 4, wherein the upper limit energy level which maximizes a grain size of the semiconductor layer corresponds to the lower limit energy level over which the polycrystal semiconductor layer is changed into an amorphous state.

9. A transistor device in which a polycrystal semiconductor layer is formed by subjecting an amorphous semiconductor layer formed on a substrate to laser anneal processing, wherein

an energy level in a region to be irradiated by a laser beam of the amorphous semiconductor layer is set such that the level in a rear area of a region along a scan direction of the laser beam is lower than the upper limit energy level which maximizes a grain size of the semiconductor layer, and

the amorphous semiconductor layer is annealed by the laser beam and the polycrystal semiconductor layer obtained is used as an active layer of the transistor device.

10. A transistor device according to claim 9, wherein

the transistor device is a thin film transistor, and

a channel layer of the thin film transistor is formed in the polycrystal semiconductor layer obtained by the laser anneal processing.

11. A transistor device according to claim 9, wherein

the transistor device is a thin film transistor,

a channel layer of the thin film transistor is formed in the polycrystal semiconductor layer obtained by the laser anneal processing, and

the thin film transistor is used as a switching device formed in a display area of a substrate forming a liquid crystal display and as a switching device of a driver circuit formed surrounding the display area of the substrate through a process substantially equal to a process of forming the switching device of the display region.